Received: 27 March 2019 | Revised: 2 May 2019 | Accepted: 13 May 2019

DOI: 10.1111/obr.12889

OBESITY MANAGEMENT

WILEY obesityreviews

Management of overweight and obesity in primary care—A systematic overview of international evidence-based guidelines

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Funding information
Main Association of Austrian Social Security Institutions

Summary

Overweight and obesity are increasing worldwide. In general practice, different approaches exist to treat people with weight problems. To provide the foundation for the development of a structured clinical pathway for overweight and obesity management in primary care, we performed a systematic overview of international evidence-based guidelines. We searched in PubMed and major guideline databases for all guidelines published in World Health Organization (WHO) "Stratum A" nations that dealt with adults with overweight or obesity. Nineteen guidelines including 711 relevant recommendations were identified. Most of them concluded that a multidisciplinary team should treat overweight and obesity as a chronic disease. Body mass index (BMI) should be used as a routine measure for diagnosis, and weight-related complications should be taken into account. A multifactorial, comprehensive lifestyle programme that includes reduced calorie intake, increased physical activity, and measures to support behavioural change for at least 6 to 12 months is recommended. After weight reduction, long-term measures for weight maintenance are necessary. Bariatric surgery can be offered to people with a BMI greater than or equal to 35 kg/m^2 when all non-surgical interventions have failed. In conclusion, there was considerable agreement in international, evidence-based guidelines on how multidisciplinary management of overweight and obesity in primary care should be performed.

KEYWORDS

adults, obesity, overweight, systematic overview

1 | INTRODUCTION

The global prevalence of obesity has risen in recent decades, with the average body mass index (BMI) of adults rising from 22 kg/m^2 in 1975 to 24 kg/m^2 in 2014. Correspondingly, the occurrence of obesity has increased from 3.2% to 10.8% in men and from 6.4% to 14.9% in women.[1] This trend is worrying, as a BMI of 30 kg/m^2 is associated with significantly increased rates of morbidity, such as diabetes mellitus[2] and coronary artery disease,[3] and of mortality.[2,4,5]

From a public health perspective, obesity is a major risk factor for a range of chronic diseases including diabetes, cardiovascular diseases and cancer.[6] According to one modelling study, an increase of two

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percentage points in the average BMI of a society reduces average life expectancy by 1 year.[7]

Numerous interventions can be recommended to people with overweight or obesity, such as dietary modifications, physical activity, behavioural changes, pharmacological treatment, and bariatric surgery. General practitioners and multidisciplinary support teams play a crucial role in helping patients achieve sustainable weight loss.[8] Patients trust the advice of primary care providers on weight management, but various barriers hinder the effective counselling and treatment of patients with overweight or obesity. On the one hand, physicians and other health professionals often lack training in the behavioural counselling and interdisciplinary team work that is necessary for a comprehensive lifestyle intervention and often have negative attitudes towards people with obesity.[9] On the other hand, overweight and obesity is not only determined by lifestyle but also by hereditary factors. This often discourages the appropriate implementation of effective evidence-based interventions.[10,11] Difficulties changing behaviour on a lasting basis may also explain the limited extent to which such interventions are implemented. One underlying reason for this may be the long-term increase in hunger-stimulating hormones that follows significant weight loss,[12] combined with continuous exposure to an obesogenic environment and its multiple and continuous temptations.[13]

It is therefore essential to carefully select evidence-based interventions when treating people with overweight or obesity in primary care. A wide range of treatment options is available, but the level of agreement between evidence-based clinical guidelines on how best to manage patients with overweight or obesity is unclear. To provide the foundation for the development of a structured and evidence-based clinical pathway for overweight and obesity management in primary care, we therefore performed a systematic overview of international evidence-based guidelines and recommendations.

2 | METHODS

2.1 | Literature search

To identify all current guidelines on overweight and obesity, we initially searched PubMed and the guideline databases of the Guideline International Network (G-I-N), the National Guideline Clearinghouse (NGC), the Association of the Scientific Medical Societies in Germany (AWMF), the National Institute for Health and Care Excellence (NICE), and the Scottish Intercollegiate Guidelines Network (SIGN), from 2011 to May 2016. In addition, we hand searched the reference lists of included publications and the websites of medical associations that deal with the topic. In February 2019, an update search was performed in PubMed and the guideline databases, with the exception of NGC, which was closed in July 2018. We used a combination of Medical subject heading (MeSH) terms and text words for obesity and overweight as search terms. Details of the searches can be found as electronic supplementary materials in the appendix.

2.2 | Selection process

Guidelines had to fulfil all of the following criteria to be included in our systematic overview:

- A target population of adults aged 18 or older with overweight or obesity
- The inclusion of recommendations on diagnosis and/or therapy for overweight or obesity
- Published in an industrial nation, as defined by the WHO Health report 2003 (Stratum A)[14]
- A development process that included a systematic search for evidence
- Published in English or German
- Published since 2011 and still valid

Two reviewers independently screened the titles and abstracts of all identified publications. The full texts of potentially relevant guidelines were assessed by the same reviewers. Discrepancies were resolved by discussion, or with the help of a third reviewer.

2.3 | Quality assessment

The methodological quality of all included guidelines was assessed using the validated guideline appraisal tool of the Appraisal of Guidelines for Research and Evaluation Collaboration (AGREE II).[15,16] The instrument consists of 23 items grouped into six domains (scope and purpose [three items], stakeholder involvement [three items], rigour of development [eight items], clarity of presentation [three items], applicability [four items], and editorial Independence [two items]) and one overall assessment item. Two reviewers with experience in guideline quality assessment appraised each guideline independently. Each item was rated on a 7-point Likert scale ranging from 1 point (strong disagreement) to 7 points (strong agreement). In accordance with the AGREE II manual, scaled domain scores were calculated by summing up the scores assigned by the individual appraisers to the items in each of the six domains, and by calculating the total as a percentage of the maximum possible score for each domain. Overall guideline quality was also rated on a 7-point Likert scale ranging from 1 point (lowest possible quality) to 7 points (highest possible quality), taking into account the previously evaluated individual items and the resulting domain scores. Guidelines were then ranked on the basis of their overall assessment scores. Since the AGREE II instrument does not provide a specific cut-off to distinguish between high- and low-quality guidelines, its users often apply a cut-off based on either the domain scores or overall guideline quality.[17] For this overview, guidelines with overall assessment scores greater than or

equal to 6 points were rated as high quality, those with 4 to 5.9 points as moderate quality, and those with less than 4 points as low quality.

2.4 | Data extraction

To characterize the guidelines, we extracted information on the topic of the guideline, the publishing society, country of origin, publication date, and the number of recommendations.

All clearly identifiable recommendations that were considered relevant to general practitioners were extracted from the included guidelines, along with their respective grades of recommendation (GoR) where indicated. We only included recommendations that could be used in individual patient management and excluded general recommendations directed at the health care system as a whole, eg, public health strategies. Recommendations that explicitly addressed children and adolescents were also excluded. In order to enable the different approaches taken by the guidelines to grade the strength of their recommendations to be compared (eg, AACE-guidelines use the letter "A" to mark strong recommendations, while NICE guidelines use words like "must" and "should" to reflect them), we developed a standardized GoR system for this overview that is based on the different approaches described in the methodological sections of the respective guidelines (GoR "A" for strong, GoR "B" for moderate, GoR "C" for weak, GoR "D" for very weak recommendations, and "EC" for expert consensus).

To provide a structured evidence-based systematic overview of international guidelines, two authors grouped the recommendations by topic and compared them with each other. It was thus possible to assess guideline recommendations for consistency and to compare them with one another with reference to the AGREE II scores in the source guidelines.

3 | RESULTS

3.1 | Results of literature search

The search in guideline databases yielded 978 potentially relevant guidelines, of which the full texts of 61 were screened further. Thirteen of these guidelines met our predefined inclusion criteria. The 2016 search in PubMed generated 1121 articles. Based on title and abstract, 1060 articles were excluded. Among the remaining 61 publications, 22, of which five were duplicates, met our inclusion criteria. The hand search revealed no other relevant publications. The update search in PubMed and in guideline databases in February 2019 yielded 634 additional, potentially relevant articles. After excluding 629 of them, we included three publications on two additional guidelines,[18-20] and two updates[21,22] of guidelines identified in the 2016 search.[23-26] Overall, 31 publications describing 19 current guidelines[18-22,27-52] on overweight and obesity were included in the final synopsis. A flow diagram outlining the literature search and selection process is provided in Figure 1.

3.2 | Characteristics and quality of included guidelines

Of the 19 included guidelines, two were published in 2018,[20,21] two in 2016,[18,19,22] three in 2015,[38,40,50,51] six in 2014,[30-37,39,47-49,52] five in 2013,[27-29,43-46] and one in 2012.[41,42] In 13 guidelines, the target population consisted of adults only, while the remaining six guidelines dealt with people of all ages.[20,22,44-48,50,51] The guidelines were developed and issued by institutions in the United States (n = 10),[18,19,21,22,27-37,40,43,52] the United Kingdom (n = 3),[47-51] Germany (n = 2),[20,39] Canada (n = 1),[38] Australia (n = 1),[46] Spain (n = 1),[41,42] and by a European medical society (n = 1).[44,45] Nine of the included

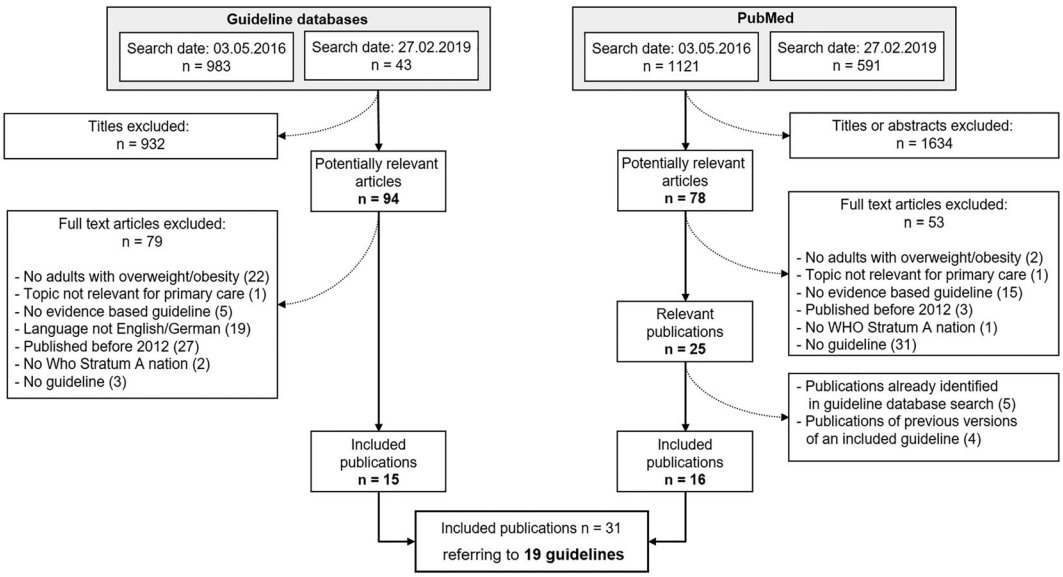

FIGURE 1 Flow chart of guideline selection process

guidelines addressed all subject areas relating to the management of overweight and obesity.[18,19,22,30-36,38,39,43,46-48,52] The remaining 10 guidelines dealt with dietary interventions (n = 3),[28,29,37,41,42] bariatric surgery (n = 3),[20,27,44,45] lifestyle interventions (n = 2),[21,49] pharmacological weight reduction (n = 1),[40] and obesity prevention (n = 1).[50,51] Details on the characteristics of the included guidelines can be found in Table 1.

Table 2 shows the AGREE II domain scores and overall assessment scores for each guideline. The mean overall assessment score for the methodological quality of the guidelines was 4.7 out of a maximum of 7 points (SD 1.5), as assessed using the AGREE II instrument. According to the classifications used in this overview, five guidelines were of high quality,[20,21,30-36,38,46] nine of moderate quality,[18,19,27,39,41-43,47-52] and the remaining five of low quality.[22,28,29,37,40,44,45] The highest overall rating was assigned to the overweight and obesity management guideline developed by the Australian National Health and Medical Research Council (NHMRC).[46] The methodological quality of the obesity prevention and management guideline published by the University of Michigan (UoM) was rated lowest.[22] An examination of the different AGREE II domains revealed that most of the guidelines achieved high scores in "Scope and Purpose," which aims to analyse to what extent the guidelines' objectives, the disease itself, and the target population are described, and in "Clarity of Presentation," which evaluates the clarity and ease of identification of recommendations. Only three guidelines attained 50% or less of the maximum possible score in Scope and Purpose[22,40,44,45] and only two achieved 50% or less in Clarity of Presentation.[22,44,45] The mean score for these two domains was 76.6%. The AGREE II domain with the lowest scores was "Applicability," which describes facilitators and barriers to the application of the guidelines as well as potential resource implications and monitoring criteria. Only two guidelines achieved more than 50% of the maximum in this domain.[46,50,51] On the other hand, five guidelines provided no information on applicability at all.[18,19,40-42,44,45,52] The mean score for this domain was 27%.

In total, 711 relevant recommendations were identified in the 19 guidelines. The number of recommendations extracted from each guideline ranged from 165 from one of the bariatric surgery guidelines[27] to only one recommendation from the US Preventive Task Force 2018 (USPTF) guideline on behavioural weight loss interventions.[21] Almost half the recommendations (n = 313; 44%) were classified as strong, which corresponds to a standardized GoR of A, while 132 were moderate and allocated a standardized GoR of B (19%), and 102 weak and received a C (14%). Sixteen recommendations were designated very weak, corresponding to a standardized GoR of D (2%). The remaining 148 recommendations (21%) were based on EC. In 15 guidelines, the level of evidence (LoE) for the underlying studies was specified in addition to the GoR. The LoEs rank studies according to the probability of bias. Systematic reviews of RCTs and high-quality RCTs are usually assigned the highest level, while case reports and expert opinions are ranked lowest.[53] The three guidelines from NICE reported only GoRs,[47-51] while one guideline (International Federation for the Surgery of Obesity [IFSO]) only provided LoEs.[44,45] According to the methodology section of the IFSO guideline, LoE corresponds to recommendation strength. Underlying evidence could be clearly assigned to individual recommendations in only a few guidelines.

In the guideline synopsis, the extracted recommendations on the management of overweight and obesity were summarized and allocated to one of nine groups, depending on topic. Table 3 provides an overview of the topics covered by recommendations in each of the included guidelines. An overview of key guideline recommendations for overweight and obesity management can be found in Table 4. Further important recommendations on the nine topics are summarized below, together with their GoR in the individual guidelines.

3.3 | Summary of recommendations

3.3.1 | General recommendations

According to the nine guidelines covering the topic,[18,19,28-37,39,41,42,47-49,52] a multidisciplinary team (AACE-2/AHA/NICE-1/NICE-2: GoR A) should be used to manage overweight and obesity as a long-term, chronic disease (AACE-2: GoR A; DAG: GoR B; VA: EC). The recommended therapeutic goal for all adults with overweight and obesity is weight loss of 0.25 to 1.0 kg per week (AACE-2/AND/FESNAD/VA: GoR A) and a 5% to 10% reduction in body weight over 6 to 12 months (AACE-2/AND/FESNAD/VA: GoR A; DAG: GoR B). In one guideline, the primary therapeutic goal was defined as improvement in the health of patients by preventing or treating weight-related complications (AACE-3: GoR EC). The specific weight-loss goals ranged from at least 5% to a 40% reduction in body weight, depending on the presence of weight-related complications (AACE-3: GoR A).

3.3.2 | Diagnosis and further assessment

This topic was covered in 12 guidelines,[18,19,22,30-39,43,46-52] all of which recommended diagnosing and classifying overweight and obesity in adults on the basis of the BMI (AACE-3/CTF/ NICE-1/ NICE-2: GoR A; AND/ NHMRC/VA: GoR B). All guidelines defined a BMI of 25 to 29.9 kg/m^2 and greater than or equal to 30 kg/m^2 as the respective cut-points for overweight and obesity. A BMI greater than or equal to 25 to less than 30 kg/m^2 was considered to be associated with increased risk of cardiovascular disease, and a BMI greater than or equal to 30 kg/m^2 with increased risk of cardiovascular disease and mortality (AHA: GoR A). Although some guidelines suggested that BMI cut-points and corresponding cardiovascular risk may vary among population groups, only one guideline recommended a specific BMI cut-point of greater than or equal to 23 kg/m^2 for overweight in Asian adults (AACE-3: GoR B). Waist circumference should not be used as a routine measure to diagnose overweight and obesity (NICE-1: GoR A), but it provides additional information on the risk of developing obesity-related long-term health problems (AACE-3/ICSI/NICE-1/ NICE- 2: GoR A; VA: GoR B). A targeted assessment of adults with overweight and obesity should be conducted and include information on possible causes, such as current weight history,

TABLE 1 Characteristics of included guidelines

Guideline	Year of Publication	Title	Publisher	Country	Main Topic	Number of Relevant Recommendations
AACE-1[27]	2013	Clinical Practice Guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient—2013 Update	American Association of clinical Endocrinologists/The Obesity Society/American Society for metabolic & bariatric Surgery)	USA	Bariatric surgery	165
AACE-2[28,29]	2013	Clinical practice guidelines for healthy eating for the prevention and treatment of metabolic and endocrine diseases in adults	American Association of clinical Endocrinologists/American College of Endocrinology/ The Obesity Society	USA	Dietary interventions	15
AACE-3[18,19]	2016	Comprehensive clinical practice guidelines for medical care of patients with obesity	American Association of clinical Endocrinologists/American College of Endocrinology	USA	Management of overweight/ obesity	160
AHA[30-36]	2014	Guideline for the management of overweight and obesity in adults	American Heart Association/ American College of Cardiology/The Obesity Society	USA	Management of overweight/ obesity	17
AND[37]	2014	Adult Weight Management	Academy of Nutrition and Dietetics	USA	Dietary interventions	31
CTF[38]	2015	Recommendations for prevention of weight gain and use of behavioral and pharmacologic interventions to manage overweight and obesity in adults in primary care	Canadian Task Force on Preventive Health Care	Canada	Management of overweight/ obesity	4
DAG[39]	2014	Prevention and therapy of obesity [OT: Prävention und Therapie der Adipositas]	German Obesity Society (Deutsche Adipositas-Gesellschaft e.V.)	Germany	Management of obesity	59
DGAV[20]	2018	Surgery for obesity and metabolic diseases [OT: Chirurgie der Adipositas und metabolischer Erkrankungen]	German society for general and visceral surgery [Deutsche Gesellschaft für Allgemein- und Viszeralchirurgie e.V.]	Germany	Bariatric surgery	36
ES[40]	2015	Pharmacological Management of Obesity	Endocrine Society-appointed Task Force of experts	USA	Pharmacological interventions	19
FESNAD[41,42]	2012	Evidence-based nutritional recommendations for the prevention and treatment of overweight and obesity in adults	Spanish Federation of Nutrition, Food and Dietetic Association/Spanish Association for the Study of Obesity	Spain	Dietary interventions	16
ICSI[43]	2013	Prevention and management of obesity for adults	Institute for Clinical Systems Improvement	USA	Management of obesity	5
IFSO[44,45]	2013	Interdisciplinary European Guidelines on Metabolic and Bariatric Surgery	International Federation for the Surgery of Obesity—European Chapter/European Association for the Study of Obesity	Europe	Bariatric surgery	19
NHMRC[46]	2013	Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia	Australian Government, National Health and Medical Research Council, Department of Health	Australia	Management of overweight/ obesity	13
NICE-1[47,48]	2014	Obesity: identification, assessment and management (CG189)	NICE/National Clinical Guideline Centre	UK	Management of overweight/ obesity	80

(Continues)

TABLE 1 (Continued)

Guideline	Year of Publication	Title	Publisher	Country	Main Topic	Number of Relevant Recommendations
NICE-2[49]	2014	Weight management: lifestyle services for overweight or obese adults (PH53)	NICE/National Clinical Guideline Centre	UK	Lifestyle interventions	7
NICE-3[50,51]	2015	Obesity prevention (CG43)	NICE/National Clinical Guideline Centre	UK	Prevention of obesity	3
UoM[22]	2016	Obesity Prevention and Management	University of Michigan	USA	Management of overweight/ obesity	31
USPTF[21]	2018	Behavioral weight loss interventions to prevent obesity-related morbidity and mortality in adults	U.S. Preventive Services Task Force	USA	Lifestyle interventions	1
VA[52]	2014	Screening and management of overweight and obesity	Department of Veterans Affairs/Department of Defense, The Management of Overweight and Obesity Working Group	USA	Management of overweight/ obesity	40

Abbreviations: AACE, American Association of Clinical Endocrinologists; AHA, American Heart Association; AND, Academy of Nutrition and Dietetics; CTF, Canadian Task Force; DAG, German Obesity Society [Deutsche Adipositas Gesellschaft]; DGAV, German Society for General and Visceral Surgery [Deutsche Gesellschaft für Allgemein- und Viszeralchirurgie]; ES, Endocrine Society; FESNAD, Spanish Federation of Nutrition, Food and Dietetic Societies [Federación Española de Sociedades de Nutrición, Alimentación y Dietética]; IFSO, International Federation for the Surgery of Obesity; ICSI, Institute for Clinical Systems Improvement; NHMRC, National Health and Medical Research Council; NICE, National Institute for Health and Care Excellence; OT, original title; UoM, University of Michigan; USPTF, US Preventive Task Force; VA, Department of Veterans Affairs.

personal lifestyle, psychosocial stress, other psychological issues, previous attempts to lose weight, social background, and the motivation and willingness to lose weight (AND/NICE-1/UoM: GoR A, DAG/NICE-3: GoR B, NHMRC: GoR D, VA: EC).

3.3.3 | Weight-related complications and other comorbidities

Weight-related complications and other comorbidities and/or risk factors were mentioned in five guidelines[18,19,22,39,40,47,48] and are considered to be an important part of a patient's medical history (AACE-3/ NICE-1: GoR A; UoM: GoR B). However, weight-related complications and other comorbidities should be managed independently of any weight-loss therapy (NICE-1/UoM: GoR A). In addition, a medication review of substances potentially responsible for weight gain should be carried out (UoM: GoR A), and weight-neutral medications, or drugs with weight-reducing effects, should be used to treat weight-related complications and other comorbidities (AACE-3/ES: GoR A; DAG: GoR D).

3.3.4 | Lifestyle change

Suggested lifestyle changes included recommendations on diets, physical activity, and behavioural interventions and was covered in all but three[18-20,44,45] of the 19 included guidelines. Weight-reduction is recommended for people with a BMI greater than or equal to 30 kg/m^2 (USPTF: GoR B; VA: GoR C), or a BMI greater than or equal to 25 kg/m^2 and weight-related complications (eg, diabetes mellitus type 2, hypertension) (AHA /ES/ NHMRC: GoR A). A multifactorial, comprehensive lifestyle programme that includes a reduction in calorie intake, an increase in physical activity, and measures to support behavioural change is recommended as a baseline therapy (AACE- 2/AACE-3/ AHA/ AND/DAG/NHMRC/NICE-1/NICE-2/VA: GoR A; CTF: GoR C). Treatment duration should be at least 6 (AHA/AND: GoR A) to 12 months (VA: GoR B) and involve individual or group sessions provided by a trained interventionist (AHA/AND: GoR A; VA: GoR B). For adults with overweight but without any weight-related complications, information and advice should be provided on how to change behaviours to achieve a healthier diet and increase physical activity (VA: GoR C).

Recommendations on lifestyle interventions aimed at maintaining a healthy weight were found in six guidelines.[28,29,37,39,46-48,52] It was noted that after weight reduction, long-term measures to maintain reduced weight are also necessary (AHA/DAG/NHMRC/NICE-1: GoR A). These should include a low-calorie, balanced diet, increased physical activity, and behavioural support (DAG: GoR B). For this purpose, patients should be regularly contacted in person or by phone at least monthly for at least a year (AHA/AND/DAG: GoR A; VA: GoR B).

Specific recommendations on dietary interventions were reported in 10 guidelines.[18,19,22,28-37,39,41,42,46-48,52] To reduce weight, nutrition professionals should provide dietary interventions (AHA / AND / DAG: GoR A) that produce a daily energy deficit of 500 to 750 kcal (AACE-3 / AHA / AND / FESNAD / NHMRC/ NICE-1: GoR A, DAG: GoR B). According to the guidelines, the composition of nutritional therapy was unimportant (AHA/ AND /UoM/VA: GoR A; DAG/ FESNAD: GoR D) as long as the diet was balanced and healthy (AACE-2 /

TABLE 2 Methodological quality of the included guidelines (AGREE II scores)

Guideline	Domain 1: Scope and Purpose[a]	Domain 2: Stakeholder Involvement[a]	Domain 3: Rigour of Development[a]	Domain 4: Clarity of Presentation[a]	Domain 5: Applicability[a]	Domain 6: Editorial Independence[a]	Overall assessment (Rank)[b]
NHMRC[46]	89%	83%	94%	**100%**[d]	**65%**[d]	92%	**7 (1)**[d]
AHA[30-36]	86%	47%	81%	92%	4%	71%	6 (3.5)
CTF[38]	**97%**[d]	53%	90%	94%	42%	83%	6 (3.5)
DGAV[20]	**92%**	**100%**[d]	93%	94%	10%	**100%**[d]	6 (3.5)
USPTF[21]	86%	25%	**96%**[d]	**100%**[d]	23%	83%	6 (3.5)
AACE-1[27]	83%	42%	79%	**100%**[d]	50%	**96%**	5.5 (7.5)
AACE-3[18,19]	81%	42%	70%	**94%**	**0%**[c]	79%	5.5 (7.5)
NICE-1[47,48]	78%	56%	77%	64%	15%	88%	5.5 (7.5)
VA[52]	89%	44%	77%	89%	**0%**[c]	**0%** [c]	5.5 (7.5)
NICE-2[49]	**97%**[d]	**91%**	93%	69%	44%	33%	5 (10.5)
NICE-3[50,51]	92%	81%	86%	61%	58%	92%	5 (10.5)
DAG[39]	83%	53%	58%	89%	4%	**96%**	4.5 (12.5)
ICSI[43]	72%	58%	57%	75%	48%	83%	4.5 (12.5)
FESNAD[41,42]	58%	28%	58%	75%	**0%**[c]	46%	4 (14)
AACE-2[28,29]	58%	19%	25%	72%	19%	33%	3 (15.5)
ES[40]	**31%**[c]	**11%**[c]	46%	86%	**0%**[c]	38%	3 (15.5)
AND[37]	83%	39%	44%	56%	19%	**0%**[c]	2.5 (17.5)
IFSO[44,45]	50%	17%	**9%**[c]	**28%**[c]	**0%**[c]	**0%**[c]	2.5 (17.5)
UoM[22]	44%	22%	10%	39%	15%	38%	**2 (19)**[c]
Mean score [SD]	76.6% [15.5%]	47.1% [22.3%]	66.9% [24.7%]	76.6% [16.6%]	27.0% [18.8%]	70.1% [24.8%]	4.7 [1.5]

Abbreviations: AACE, American Association of Clinical Endocrinologists; AHA, American Heart Association; AND, Academy of Nutrition and Dietetics; CTF, Canadian Task Force; DAG, German Obesity Society [Deutsche Adipositas Gesellschaft]; DGAV, German Society for General and Visceral Surgery [Deutsche Gesellschaft für Allgemein- und Viszeralchirurgie]; ES, Endocrine Society; FESNAD, Spanish Federation of Nutrition, Food and Dietetic Societies [Federación Española de Sociedades de Nutrición, Alimentación y Dietética]; IFSO, International Federation for the Surgery of Obesity; ICSI, Institute for Clinical Systems Improvement; NHMRC, National Health and Medical Research Council; NICE, National Institute for Health and Care Excellence; SD, Standard deviation; UoM, University of Michigan; USPTF, US Preventive Task Force; VA, Department of Veterans Affairs.

[a]Scaled domain scores: percentage reached of the maximum possible score.

[b]Overall assessment: 1 point = lowest possible quality, 7 points = highest possible quality.

[c]Lowest score.

[d]Highest score.

AACE-3 /DAG/ NICE-1: GoR A). In addition, to optimize adherence, dietary interventions should be individualized and based on personal and cultural preferences (AACE-3 / AHA/NICE-1/DAG: GoR A). Structured meal plans (AACE-3/ AND: GoR A), portion control (AACE-2 / AND: GoR A), and meal replacements (AACE-3/AND /VA: GoR A; FESNAD: GoR D) are recommended as possible interventions. Unduly restrictive and nutritionally unbalanced diets, or fad diets, are explicitly not recommended (AACE-2/DAG/FESNAD/NICE-1: GoR A). Very low calorie diets (calorie intake ≤800 kcal/day) should not be used routinely in the treatment of obesity (AACE-3/FESNAD/NICE-1: GoR A), but only for certain indications and medical conditions, eg, in case of weight-related complications or circumstances that require faster weight loss (AACE-2/AHA: GoR B; NICE-1: GoR C; FESNAD: GoR D). Very low calorie diets always need medical supervision (AACE-2/AACE-3: GoR A; AHA/FESNAD/VA: GoR B).

Eight guidelines discussed the importance of physical activity.[18,19,22,37,39,46-48,50-52] Interventions to increase physical activity should be individualized to include activities that take account of patients' capabilities and preferences (NICE-1 / NICE-3: GoR A; DAG: GoR B; AACE-3: GoR C) and should focus on activities of daily living (eg, walking, cycling, and gardening) (DAG/ NICE-1/NICE-3: GoR A). For persons with a BMI greater than 35 kg/m^2, activities should be chosen that do not burden the musculoskeletal system (DAG: GoR B). The majority of guidelines recommended at least 30 minutes of moderate-intensity endurance exercise five or more days a week, in combination with strength training (AACE-3/NICE-1/UoM/VA: GoR A; DAG: GoR B; AND: EC). One guideline indicated that resistance exercise alone does not reduce weight effectively (DAG: GoR B). In general, a reduction in sedentary activities (eg, watching TV, computer use) is recommended (AACE-3/NICE-1/UoM: GoR A).

TABLE 3 Topics covered by recommendations in included guidelines

Guideline	General Recommendations	Diagnosis and Further Assessment	Comorbidities	Lifestyle Change				Pharmacological weight-reduction	Bariatric surgery
				General	Dietary Interventions	Physical Activity	Behavioural Interventions		
AACE-1[27]									●
AACE-2[28,29]	●			●	●		●		
AACE-3[18,19]	●	●	●	●	●	●	●	●	●
AHA[30-36]	●	●		●	●		●		●
AND[37]	●	●		●	●	●	●		
CTF[38]		●		●			●	●	
DAG[39]	●	●	●	●	●	●	●	●	●
DGAV[20]									●
ES[40]			●	●				●	●
FESNAD[41,42]	●				●				
ICSI[43]		●					●		
IFSO[44,45]									●
NHMRC[46]		●		●	●	●	●	●	●
NICE-1[47,48]	●	●	●	●	●	●	●	●	●
NICE-2[49]	●	●		●					
NICE-3[50,51]		●				●			
UoM[22]		●	●		●	●			●
USPTF[42,45,46]				●			●		
VA[21]	●	●		●	●	●	●	●	●

Abbreviations: AACE, American Association of Clinical Endocrinologists; AHA, American Heart Association; AND, Academy of Nutrition and Dietetics; CTF, Canadian Task Force; DAG, German Obesity Society [Deutsche Adipositas Gesellschaft]; DGAV, German Society for General and Visceral Surgery [Deutsche Gesellschaft für Allgemein- und Viszeralchirurgie]; ES, Endocrine Society; FESNAD, Spanish Federation of Nutrition, Food and Dietetic Societies [Federación Española de Sociedades de Nutrición, Alimentación y Dietética]; IFSO, International Federation for the Surgery of Obesity; ICSI, Institute for Clinical Systems Improvement; NHMRC, National Health and Medical Research Council; NICE, National Institute for Health and Care Excellence; UoM, University of Michigan; USPTF, US Preventive Task Force; VA, Department of Veterans Affairs.

Note. ● Topic covered by guideline recommendations

Recommendations on specific behavioural interventions were found in eleven guidelines.[18,19,21,28-39,43,46-48,52] These guidelines recommended supportive structured behavioural interventions (AACE-3 /CTF/ DAG: GoR A; AACE-2/USPTF: GoR B) for all adults with an indication for weight loss, possibly in the form of individual or group sessions (NICE-1: GoR A). Behavioural interventions should contain various strategies such as motivational interviewing (AACE-3 /AND/DAG/ICSI/ NICE-1: GoR A; VA: EC), stimulus control (AACE-3/DAG/ NICE-1: GoR A; AND: GoR B), and cognitive restructuring (AACE-3/DAG/NICE-1: GoR A; AND: GoR B). In addition, self-monitoring is recommended as an essential part of behavioural interventions. Patients should be encouraged to keep track of their dietary intake, physical activity level, and body weight (AACE-2/ AACE-3/AHA/ICSI/NICE-1/NICE-3: GoR A; USPTF: GoR B; NHMRC: GoR C). According to one recent guideline, behavioural interventions should be intensified if a 2.5% weight loss is not achieved during the first month of therapy (AACE-3: GoR A), since early weight loss contributes strongly towards long-term success.

3.3.5 | Pharmacological weight-reduction

In seven guidelines,[18,19,38-40,46-48,52] pharmacological weight-reduction using medications approved for long-term weight-management is only recommended as an adjunct to lifestyle interventions. Specifically, recommendations were for adults with a BMI greater than or equal to 30 kg/m^2, a BMI greater than or equal to 27 kg/m^2 and weight-related complications (AACE-3/ES/NHMRC/VA: GoR A), a BMI of greater than or equal to 28 kg/m^2 and additional risk factors (NICE-1: GoR A; DAG: GoR D), and when sufficient weight loss could not be achieved through lifestyle interventions alone (VA: GoR B, NICE-1: GoR C). Pharmacological weight reduction should only be maintained when a person has lost at least 5% of their initial body weight during the first 3 months (ES/ NICE-1: GoR A), or at least 2 kg during the first 4 weeks (DAG: GoR B) of treatment. In patients with obesity and for whom the potential benefits outweigh the risks, weight-reducing medication should be offered for chronic weight-maintenance (AACE-3: GoR A; AACE-1/NICE-1: GoR C). The use of weight-reducing drugs in pregnant (AACE-3: GoR

TABLE 4 Key recommendations for obesity management in guidelines from high-income countries

Obesity should be treated as a chronic disease.
Overweight and obesity should be managed by a multidisciplinary team.
BMI should be used as a routine measure for diagnosis.
BMI ≥25 to <30 kg/m^2 is associated with increased risk of cardiovascular disease, and BMI ≥30 kg/m^2 with increased risk of cardiovascular disease and mortality.
Waist circumference should be used as an additional measure to assess the risk of developing obesity-related long-term health problems.
A multifactorial, comprehensive lifestyle intervention for at least 6 to 12 months that includes a reduction in calorie intake, an increase in physical activity, and measures to support behavioural change, is essential in the treatment of overweight and obesity.
Pharmacological weight reduction is only recommended as an adjunct to lifestyle interventions
When all non-surgical interventions have failed, bariatric surgery may be a treatment option for people with a BMI of at least 35 kg/m^2.
After bariatric surgery, long-term follow-up care should be provided.

Abbreviation: BMI, body-mass-index

A) and lactating or breast-feeding women (AACE-3: GoR EC) is not recommended, while in elderly persons, pharmacological weight-reduction should be used with extra caution (AACE-3: GoR A). The guidelines also discourage the off-label use of medications approved for other diseases (eg, amphetamines, diuretics, and thyroxine) for the sole purpose of producing weight loss (DAG: GoR A, ES: EC) and the use of other dietary supplements and medical products to achieve weight reduction (DAG: GoR A).

3.3.6 | Bariatric surgery

Eleven guidelines recommend undertaking bariatric surgery,[18-20,22,27,30-36,39,40,44-48,52] which is a treatment option in adults with a BMI greater than or equal to 40 kg/m^2 or a BMI greater than or equal to 35 kg/m^2 with weight-related complications (AACE-1/AACE-3/ES/IFSO/NHMRC/ NICE-1, VA: GoR A; DGAV: GoR EC), when all non-surgical weight loss interventions have failed (DAG/NICE-1: GoR A, AHA/IFSO/UoM: GoR B; DGAV: GoR EC). In adults with a BMI above 50 kg/m^2, bariatric surgery is considered a treatment option whether or not conservative weight-reducing interventions have been carried out previously (NICE-1: GoR A; DAG: GoR D). The decision to offer surgery should follow a comprehensive multidisciplinary assessment (AACE-3/DAG: GoR A; IFSO: GoR B; DGAV: GoR EC). Bariatric surgery may also be considered in patients that have diabetes and a BMI between 30 and 34.9 kg/m^2 (AACE-1: GoR B; AACE-3/NICE-1: GoR C; DGAV: GoR EC), although available evidence is limited and long-term data lacking. According to the guidelines, higher age is not a contraindication for bariatric surgery (DGAV: GoR EC). However, an assessment of the benefits and harms of bariatric surgery in persons aged 65 years or older is currently impossible due to insufficient evidence (VA: GoR A; AACE-1: GoR B; NICE-1: GoR C; AHA: GoR D). After bariatric surgery, long-term multidisciplinary follow-up care (NICE-1: GoR A; DGAV: GoR EC) is required for at least 2 years (NICE-1: GoR A) and sometimes for the remainder of the patient's life (DAG: GoR A; DGAV/VA: EC). The frequency of care appointments depends on the type of surgical procedure and the severity of weight-related complications and other comorbidities (AACE-1: EC). Furthermore, an appointment with a physician familiar with the treatment of obesity and bariatric surgery is recommended at least once a year (NICE-1: GoR A; DGAV: GoR EC). Specific recommendations on the content of such long-term follow-up were made in four guidelines (NICE-1: GoR A, AACE-1/IFSO: GoR B; DGAV: GoR EC) and include dietetic and micronutrient monitoring, individualized nutritional supplementation, and psychological support.

3.3.7 | Participation of healthcare professionals

All guidelines stated that the care of patients with overweight and obesity should be multidisciplinary and performed by trained primary care professionals. The choice of specific health professionals depended on the recommended treatment (general recommendations, lifestyle changes, dietary interventions, physical activity, and bariatric surgery). The information was provided in general terms for behavioural, pharmacological, and weight-maintaining interventions. Details on individual recommendations can be found in the online supplement.

4 | DISCUSSION

This systematic guideline overview identified and gathered information on how to structure treatment for overweight and obesity in adult patients in primary care from 19 international guidelines[18-22,27-52] that were published in WHO "Stratum A" countries.[14] Altogether, 711 relevant recommendations were identified and almost half the recommendations were described as strong.

4.1 | Key findings (see also Table 4)

Most of the guidelines included a clear statement that overweight and obesity should be treated as a chronic disease and managed by a multidisciplinary team.

The identified guidelines were in agreement that BMI should be used as a routine measure for diagnosis and that a BMI greater than or equal to 25 to less than 30 kg/m^2 is associated with an increased risk of cardiovascular disease, and a BMI greater than or equal to 30 kg/m^2 with an increased risk of cardiovascular disease and mortality. Furthermore, waist circumference should be used as an additional measure for the risk of developing obesity-related long-term health problems. In all cases, weight-related complications, other comorbidities, and medications that may be responsible for weight gain should be taken into account.

A multifactorial, comprehensive lifestyle programme that includes a reduction in calorie intake, an increase in physical activity, and

measures to support behavioural change for at least 6 to 12 months is considered essential in the treatment of overweight and obesity. It was noted that after weight reduction, long-term measures for weight maintenance are necessary that include a healthy, low-calorie balanced diet, increased physical activity, and behavioural support involving regular contact, either in person or by telephone, for at least 1 year. Pharmacological weight reduction is only recommended as an adjunct to lifestyle interventions, and off-label use of medications for the sole purpose of producing weight loss should be avoided. Bariatric surgery is mainly a treatment option for people with a BMI of at least 35 kg/m^2 when all non-surgical interventions have failed. The final decision should be made by a multidisciplinary team that should also provide the patient with long-term follow-up care after surgery.

4.2 | Overweight and obesity in primary care

Overweight and obesity are complex conditions and maintaining weight loss over the long term is one of the biggest challenges in overweight and obesity management. In this context, one key factor, which is addressed in nearly all guidelines, is the adoption of a multicomponent and multidisciplinary approach. Recent research has indicated that comprehensive programmes administered by multiprofessional teams are required for success.[54,55] In addition, a qualitative study investigating the beliefs, skills, and knowledge of involved researchers, practitioners, and patients reported that close multidisciplinary collaboration and knowledge about the role of each participant in the management process, combined with continuous monitoring, may contribute towards treatment success.[56]

The aim of this project was to provide a clear and systematic overview, based on which structured care processes could be defined for the management of overweight and obesity in primary care. It was initiated by the Main Association of Austrian Social Security Institutions as the first of three overviews on overweight/obesity, chronic obstructive pulmonary disease, and unspecific back pain. The results are to be incorporated in clinical pathways for primary care teams. A scoping review published by Sturgiss in 2018[57] showed that the literature is divided on the role family doctors and other health professionals should play in obesity management. Although general practitioners are mostly involved in diagnosis and assessment, their role in obesity care is often underestimated.[57] Another review concluded that studies performed in primary care provide little evidence on the effectiveness of overweight and obesity management and that further research is needed to define the role of primary care providers in the context of comprehensive and multi-professional care.[58] As most trials are performed in specialist obesity clinics and research centres, trials in primary care and information on long-term health outcomes are only available to a limited degree.[59-61] Based on our review, we were therefore unable to clearly define which components of obesity management should be delivered in which healthcare setting, not least because of differences in healthcare systems themselves. Nevertheless, research on the importance of primary care has shown that countries with a highly developed primary care sector that is both comprehensive and coordinates its activities with other medical professionals achieve better population health outcomes and reduced socio-economic health inequalities, both in the Organisation for Economic Co-operation and Development (OECD)[62] and the European Union.[63] To develop clinical pathways, we relied mainly on strong recommendations extracted from the included guidelines, treatment algorithms identified during the search of other guidelines, and the webpages of relevant associations.

Further details are described in the full report of the Main Association of Austrian Social Security Institutions.[64]

4.3 | Strengths and limitations

The strengths of this overview were the inclusion of all 19 current evidence-based guidelines that could be identified using a comprehensive search strategy. Another strength was the high number of recommendations classified as strong. Out of a total of 711 identified recommendations, 44% were classified as strong (corresponding to a standardized GoR of A) and a further 19% were classified as moderate (corresponding to a standardized GoR of B). A further strength is the high degree of agreement between individual publishing associations and the groups of authors responsible for preparing the guidelines, ie, there were no contradictory recommendations. Current guidelines on hypertension, for example, show that this is not always the case. Based on the same evidence, the European Society of Cardiology (ESC) guideline[65] and the American College of Cardiology/American Heart Association (ACC/AHA) guideline[66] define hypertension differently, with greater than or equal to 140/90 mmHg for stage 1 hypertension in the 2018 ESC guideline comparing with as low as greater than or equal to130/80 mmHg for stage 1 hypertension in the 2017 ACC/AHA guideline. Blood pressure target values also differ.

Limitations of this study were the sole inclusion of guidelines from high-income WHO Stratum A countries and the exclusion of guidelines that were not in English or German. The included guidelines therefore only reflected conditions in high-income countries. Additionally, more than half of them came from the United States, where the healthcare system has different characteristics to those in other high-income countries. Although only evidence-based guidelines were included and many of the specific recommendations were classified as strong, the methodological quality (based on an AGREE II assessment) of the included guidelines was only moderate in most of them. The low quality of the included guidelines in the AGREE II domain applicability made it difficult to draw conclusions on the clinical implementability of recommendations. In most cases, the guidelines did not address supporting factors and barriers to applications and provided no specific tools to enable recommendations to be put into practice. As it may not be possible to directly transfer results from one population group to another, a further limitation to applicability is that recommended BMI cut-points did not take different ethnic groups and national health systems into account.

5 | CONCLUSIONS

To the best of our knowledge, this is the first time a structured systematic overview of international guidelines has been performed that includes all subjects relating to overweight and obesity management. These range from general recommendations, diagnoses, and assessments to the various treatment options. The 19 identified evidence-based guidelines included 711 distinct recommendations and there were no relevant discrepancies between them. Thus there is considerable international agreement on how best to define a multidisciplinary clinical pathway for the management of overweight and obesity in primary care in high-income countries.

ACKNOWLEDGEMENTS

Andreas Domke, Muna Abuzahra, and Nicole Posch supported us during the screening process. We would also like to thank Bettina Maringer for her helpful comments on this manuscript and Phillip Elliott who edited it.

CONFLICTS OF INTEREST

This manuscript is based on the report "(Be-)Handlungspfad Übergewicht & Adipositas auf Primärversorgungsebene, Version 1.2; 2016," which was funded by the Main Association of Austrian Social Security Institutions (http://www.hauptverband.at). None of the authors have conflicts of interest to declare.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

How to cite this article: Semlitsch T, Stigler FL, Jeitler K, Horvath K, Siebenhofer A. Management of overweight and obesity in primary care—A systematic overview of international evidence-based guidelines. *Obesity Reviews*. 2019;20:1218–1230. https://doi.org/10.1111/obr.12889